



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/565,466

01/20/2006

Craig N. Schubert

63149A

9819

109 7590 08/24/2009

The Dow Chemical Company
Intellectual Property Section
P.O. Box 1967
Midland, MI 48641-1967

EXAMINER

WU, IVES J

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

08/24/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/565,466	Applicant(s) SCHUBERT ET AL.	
	Examiner IVES WU	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/22/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

(1). Applicants' Affidavits and Remarks filed on 6/22/2009 have been received.

The rejections of claims 1-16 in prior Office Action dated 2/25/2009 is withdrawn in view of current Affidavits.

However, a new ground of rejections for claims 1-16 is introduced in the following.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

(2). **Claims 1, 2, 4-6, 8-9, 13, 15-16** are rejected under 35 U.S.C. 102(e) as being anticipated by Rochelle (US 20070028774A1).

As to in a process for removal and recovery of absorbed acid gas from an aqueous treatment Fluid, which Fluid comprises at least one chemically absorbed acid gas and at least one acid gas-absorbing chemical Agent, and the reclamation of at least one such Agent from the treatment Fluid, and in which Process the reclamation is conducted in an endo-thermal Separation Step wherein the Fluid is separated into a) at least one liquid-phase Stream A rich in the absorbing Agent and b) at least one gaseous-phase Stream B rich in the acid gas, and Stream B is thereafter recovered and subjected to compression in a compression Device in **independent claim 1**, Rochelle (US 20070028774A1) discloses regeneration of an aqueous solution from an acid gas absorption process by multistage flashing and stripping (Title). By replacing the conventional stripper used to regenerate the aqueous solvent and capture the acid gas with a multi-pressure stripper that combined acid gas compression with stripping, less energy is

consumed (Abstract, line 3-7). The absorption process stage, the gaseous stream is contacted with an aqueous solvent (such as an aqueous amine, an aqueous alkanolamine or mixtures thereof, or an amine promoted aqueous potassium carbonate) in an absorption equipment-rich that the acid gas in the gaseous stream is transferred from the gaseous stream to the solvent, resulting in a purified gaseous stream exiting the absorption equipment and acid gas-rich solvent stream exiting the absorption equipment ([0027], line 1-9). By regenerating the acid gas at a higher pressure without operating the stripper at a greater temperature, the method reduces the energy consumption of systems in which the carbon dioxide must be compressed for sequestration, production of methanol, tertiary oil recovery, or other applications ([0014], line 10-15). It is further shown in the Figure below.

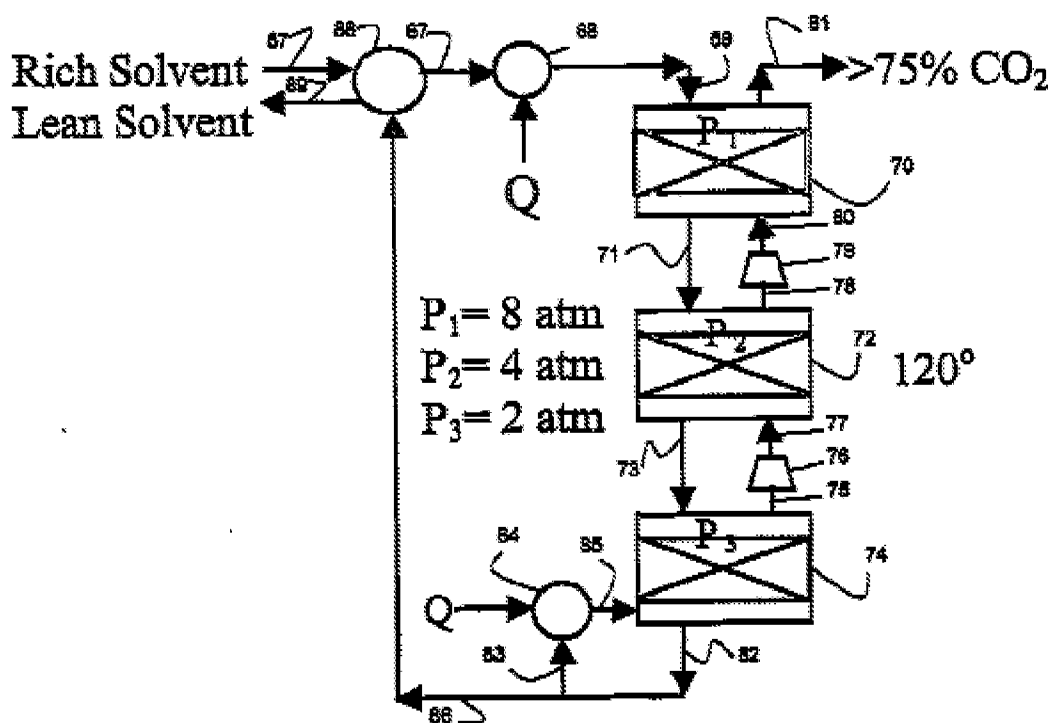


FIG. 4

As to improvement comprising: 1) conducting the Separation Step in a pressure Vessel under a pressure that exceeds 50 *psia* and does not exceed about 300 *psia*, while supplying to the Fluid sufficient heat to separate gaseous-phase Stream B from liquid-phase Stream A, and 2) subsequently introducing Stream B under pressure to the intake of the compression device in

independent claim 1, Separation Step pressure exceeding 55 psia in **claim 2**, as shown in the Figure above, three stripping stages, P2 stage, compressor 79 meets the limitations as claimed.

As to the step after conducting the Separation Step but before introducing Stream B to the intake of the compression Device, Stream B is treated by passing it to a condenser, cooling it to a temperature that allows the acid gases to pass the condenser but is sufficiently low to remove one or more other condensable gas from Stream B in **claim 4**, as shown in the Figure 2 of Rochelle (US 20070028774A1), the condenser 37 before the compressor 38.

As to at least one acid gas-absorbing chemical Agent in the treatment Fluid to be alkanolamine comprising from 2 to 6 carbon atoms in **claim 5**, selection of gas-absorbing chemical agent in **claim 6**, Rochelle (US 20070028774A1) discloses non-limiting examples of alkanolamines suitable for use to be mono-ethanolamine (MEA), diethanolamine (DEA), and methyl diethanolamine (MDEA) ([0037], line 15-18).

As to chemical absorbed acid gas of carbon dioxide and steps 1 to 4 in **independent claim 8**, the disclosure of Rochelle is incorporated herein by reference, the most subject matters as currently claimed, have been recited in applicants' claim 1 and have been discussed therein.

As to gas stream after compression to be disposed by injection to an ocean- or sea-bed or into a subterranean chamber or formation in **claim 9**, Rochelle (US 20070028774A1) discloses, by regenerating the acid gas at a higher pressure without operating the stripper at a greater temperature, the method reduces the energy consumption of systems in which the carbon dioxide must be compressed for **sequestration**, production of methanol, tertiary oil recovery, or other applications ([0014], line 10-15).

As to stripping acid gas from acid gas absorption Fluid taking place in a pressure Vessel at a pressure in excess of about 55 psia and below about 300 psia in **claim 13**, stripping acid gas from the acid gas absorption fluid taking place in a pressure vessel at a pressure in excess of about 50 psia and below about 200 psia in **claim 15**, stripping acid gas from the acid gas-rich absorption fluid taking place in a pressure Vessel at a pressure in excess of about 50 psia and below about 155 psia in **claim 16**, as shown in the Figure above, the stripping stage P2 at 4 atm meets the claims.

Art Unit: 1797

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

(3). **Claims 3, 10, 12, 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Rochelle (US 20070028774A1).

As to Separation Step pressure exceeding 130 *psia* in **claim 3**, stripping acid gas from acid gas-rich absorption Fluid taking place in a pressure Vessel at a pressure in excess of about 130 *psia* and below about 300 *psia* in **claim 14**, Rochelle (US 20070028774A1) discloses, when used for carbon dioxide sequestration and other applications, the product dioxide is compressed to 100-150 atm ([0008], line 9-11). It would be obvious to have stripping stage at a pressure in excess of about 130 *psia* and below about 200 *psia* at least for the application of sequestration.

As to heat being supplied to Fluid in the Vessel in a sufficient quantity that Separation Step is conducted at a temperature in excess of 280 deg.F and below 400 deg.F in **claim 10** and **claim 12**, as shown in the Figure above the temperature of stripping stage is 120 deg. C. it would be obvious to have temperature of stripping stage in excess 280 deg.F and below 400 deg.F in order to attain the maximum efficiency of stripping effect.

(4). **Claims 7 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Rochelle (US 20070028774A1) in view of Asprion et al (US 7004997B2).

As to at least selection of one co-solvent to be included in treatment Fluid for acid gas in **claims 7 and 11**, Rochelle discloses alkanolamine, MEA, but **do not teach** co-solvent as claimed.

However, Asprion et al (US 7004997B2) **teach** method for removal of acid gases from a gas flow (Title). It is known to remove the unwanted acid gas constituents from the gases by gas scrubbing with aqueous or nonaqueous mixtures of organic solvents as adsorbents. In this process both physical and chemical solvents are used. Known physical solvents are, for example, cyclotetramethylenesulfone (sulfolane), N-methylpyrrolidone and N-alkylated piperidones. The chemical solvents which have proven themselves industrially are, in particular, the aqueous solutions of primary, secondary and tertiary aliphatic amines and alkanolamines such as monoethanolamine (MEA), diethanolamine (DEA), monomethylethanolamine (MMEA), diethylethanolamine (DEEA), triethanolamine (TEA), diisopropanolamine (DIPA) and methyldiethanolamine (MDEA) (Col. 1, line 36-48).

In view of the recognized functional equivalent adsorbents for acid gas such as MEA, Sulfolane disclosed by Asprion et al, and by Applicants, it would have been obvious at time of the invention to include physical solvent such as sulfolane with MEA disclosed by Rochelle in scrubbing solvent of Rochelle, since each member of the combination is known individually as an effective adsorbent and the person of ordinary skill in the art would have expected such a combination to work in an additive or cumulative manner. *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980).

Response to Arguments

(5). Applicant's arguments, see Affidavits, filed 6/22/2009, with respect to the rejection(s) of claim(s) 1-16 under 102(e) in view of Rochelle "Innovative Stripper Configurations to Reduce the Energy Cost of CO₂ Capture" at May 5-8, 2003 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Rochelle (US 20070028774A1).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IVES WU whose telephone number is (571)272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1797

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu

Art Unit: 1797

Date: August 17, 2009

/DUANE SMITH/

Supervisory Patent Examiner, Art Unit 1797